

Abstract

An encoder generates an estimate of apparent inter-image motion utilizing a dense motion field in a sequence of video frames or other images. The estimate in an illustrative embodiment includes a motion vector for each pixel of the dense motion field. The estimate is generated at least in part as a solution to a constrained optimization problem based on a multiscale data model characterizing the motion between pixels of the dense motion field and designated neighbor pixels. The estimate is used for motion compensation in encoding the corresponding images, and is itself encoded for transmission to a decoder for use in decoding the encoded images. In the illustrative embodiment, the multiscale data model characterizes spatial, temporal and scale coherence properties of the motion as a Markov random field (MRF), thereby ensuring that the resulting motion vectors can be efficiently coded for transmission to the decoder.

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